Monilinia blossom blight in experimental plantings of sweet and sour cherries

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Abstract

Very favourable weather conditions for Monilinia laxa infections appeared during flowering sweet and sour cherries in 2014 in Holovousy (Czech Republic). The aim of this study was to record the average value of the attack and the highest attack of Monilinia laxa for the particular cultivar. In our orchard we evaluated two parameters: intensity of blossom infestation (scale 0 – 4; 0 – without infestation; 4 – whole flower infested and seared) and the total flower infestation of the tree (scale 1 – 9; 1 - without infestation; 9 – 100 % of tree affected). In total 24 sweet cherry cultivars and 23 sour cherry cultivars were evaluated. 'Regina' and 'S.H.Giant' appeared as the most resistant sweet cherry cultivars and 'Jade', 'Jachim' and 'Spinell' appeared as the most resistant sour cherry cultivars from the overall assessment.

Keywords: *Monilinia laxa*, fungal disease of blossom, sweet cherry cultivars, sour cherry cultivars, pathogen infestation

Introduction

Monilinia blossom blight caused by an ascomycete fungus *Monilinia laxa* is one of the most serious diseases of stone fruits. The period between "white buds" phenophase and flowering cessation when the petals are falling away is crucial for development of the blossom infection (Dimova & Titjnov, 2013). The most susceptible is a phase of fully open flower with all flower parts accessible to first infection (Holb, 2008; Dimova & Titjnov, 2013).

Material and Methods

The assessment of sweet and sour cherry cultivars was realized in experimental orchards in Holovousy (Czech Republic, Eastern Bohemia; average altitude 306 m, average temperature 8.1 °C and annual rainfall 655 mm). During blossom in 2014 favourable weather conditions for development of the fungal pathogen *Monilinia laxa* (Aderh. & Ruhl.) occurred that resulted in an increased incidence of the *Monilinia* blossom blight both on sweet and sour cherries. Trees were evaluated at the end of April 2014 when the blooming stage most of them was near or in the final flowering phase (BBCH 65–67). Totally twenty four sweet cherry cultivars were evaluated. The average value of infestation in different stands was calculated and trees with the highest recorded infestation value was determined. Among sour cherries twenty tree cultivars were evaluated in one site named Kamenec. The fungicide Sporgon (0.4 kg/ha) was applied in the beginning of the blooming period (7th April 2014) at all sites.

Two parameters were evaluated on flowering trees: intensity of blossom infestation (scale 0 – 4; 0 – without infestation, 1 – few small brown spots on petals, < 10 % petals affected, 2 - smaller part of petals is brownish; ± 25 % of petals affected, 3 – greater part of petals is brownish, ± 50 % of petals affected, 4 – whole flower is infested and seared, > 75 % petals affected) and the total flower infestation of the tree (scale 1 – 9; 1 – tree flowers without

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infestation, 2 – < 10 % tree flowers affected, 3 – ± 25 % tree flowers affected, 4 – intermediate, 5 – ± 50 % tree flowers affected, 6 – intermediate, 7 – ± 75 % tree flowers affected, 8 – intermediate, 9 – > 90 % of the tree affected).

Results

In spring 2014 the growing season began earlier than usual. Most of the sweet cherry trees began to bloom during the April 4 to 6. Early blooming sour cherry began to bloom on April 7, late blooming cultivars after April 17. During three days (April 4th, 5th and 6th), when the most of the cherry trees began to bloom, the air humidity was very high (87 % - 97.2 %) and the average temperature was 10.8 °C (table 1). These weather conditions could be the reason of higher infestation incidence in 2014 than in previous years.

Table 1: Weather conditions during the flowering time of cherries.

Date	Temperature (°C)	tmax. (°C)	tmin. (°C)	Humidity (%)	Precipitation (mm)
4. 4.	13.8	20.6	6.1	74.2	0
5. 4.	10.8	14.3	8	97.2	0
6. 4.	10.7	18.1	5.4	87.0	0
7. 4.	12.3	21.6	3.1	80.9	0
8. 4.	12.9	20.6	7.4	77.6	0
9. 4.	6.6	11.6	2.3	81.1	0.7
10. 4.	5.5	8.6	2.1	99.0	5.8
11. 4.	6.5	14.3	1.0	84.8	0
12. 4.	8.4	17.4	1.8	86.7	0.3
13. 4.	9.1	14.6	5.0	88.4	2
14. 4.	6.5	11.8	2.4	94.2	4.1
15. 4.	4.5	9.6	2.3	95.3	1
16. 4.	6.1	11.6	-0.3	73.5	0.3
17. 4.	6.3	14.6	-2.0	67.5	0
18. 4.	5.2	10.3	-0.1	88.2	0
19. 4.	11.2	20.6	-0.3	74.9	0

In this study cultivars ‘Regina’ and ‘S.H.Giant’ appeared as the most resistant sweet cherry to blossom blight (table 2, figure 1 a, b). ‘Regina’ is a late blooming cultivar and bloomed approximately a week later than others cultivars (April 11). Between sour cherries cultivars ´Jade´, ´Jachim´ and ´Spinell´ appeared as the most resistant to blossom blight (table 3, figure 2 a, b). Those cultivars are also late blooming ´Jade´ - April 19, ´Jachim´ - April 18 and ´Spinell´ - April 18. Our evaluation suggests that late-flowering varieties of cherries were less susceptible to infection than early flowering. ‘Regina’ could avoid the largest pathogen pressure due to late flowering. Late blooming cultivars of sour cherries also avoid the rainy week (in the period April 9 to 15), which could largely contribute to a slow down up to stop spreading of infection.

Table 2: Evaluation of monilinia blossom blight in sweet cherry cultivars.

Cultivar	Intensity of blossom infestation		Total infestation of the tree		Beginning of blooming
	Average	The highest infestation	Average	The highest infestation	
'Regina'	1	2	2	5	11. 4.
'S.H.Giant'	1	2	2	2	4. 4.
'Amid'	1-2	2	3	5	7. 4.
'Kordia'	1-2	3	3	4	7. 4.
'Tim'	1-2	3	3	3	6. 4.
'Korvik'	1-2	2	4	7	6. 4.
'Kasandra'	1-2	2	5	7	6. 4.
'Sandra'	2	3	3	7	5. 4.
'Skeena'	2	2-3	3	5	6. 4.
'Sylvana'	2	3	3	4	5. 4.
'Vilma'	2	3	3	3	5. 4.
'Early Korvik'	2	2	4	6	5. 4.
'Fabiola'	2	3	4	4	5. 4.
'Horka'	2	3	4	8	6. 4.
'Jacinta'	2	3	4	6	6. 4.
'Justyna'	2	3	4	4	4. 4.
'Lívia'	2	3	4	5	5. 4.
'Těchlovan'	2	3	4	5	6. 4.
'Vanda'	2	3	4	5	4. 4.
'Summit'	2	2	4	5	6. 4.
'Felicita'	2	2	5	8	5. 4.
'Van'	3	4	5	5	4. 4.

Table 3. Evaluation of monilinia blossom blight in sour cherry cultivars.

Cultivar	Intensity of blossom infestation		Total infestation of the tree		Beginning of blooming
	Average	The highest infestation	Average	The highest infestation	
'Jade'	1	1	2	2	19. 4.
'Jachim'	1	1	2	2	18. 4.
'Spinell'	1	1	2	2	18. 4.
'Boas'	1	2	2	3	17. 4.
'Coralin'	1-2	2	2	2	18. 4.
'Schattenmorelle'	1-2	2	2	2	17. 4.
'Csengödi'	1-2	3	3	6	17. 4.
'Fanal'	1-2	2	3	2	17. 4.
'Morava'	1-2	2	3	3	17. 4.
'Morellenfeuer'	1-2	2	3	4	14. 4.
'Samor'	1-2	2	3	3	17. 4.
'Morsam'	2	3	2	2	15. 4.
'Újfehërtoi Fürtös'	2	2-3	4	4	10. 4.
'Morina'	2	2	5	5	12. 4.
'Achat'	2-3	3	3	3	11. 4.
'Bare'	2-3	3	4	5	10. 4.
'Erdi Krupnoplodnaja'	2-3	3	4	4	10. 4.
'Piramis'	2-3	3	4	4	9. 4.
'Hana'	2-3	3	5	5	7. 4.
'Španka Doněckaja'	2-3	3	5	5	10. 4.
'Čudovišňa'	2-3	2-3	8	8	10. 4.
'Erdi Bötermö'	3	3	5	6	8. 4.
'Pipacs 1'	3	3-4	6	8	10. 4.

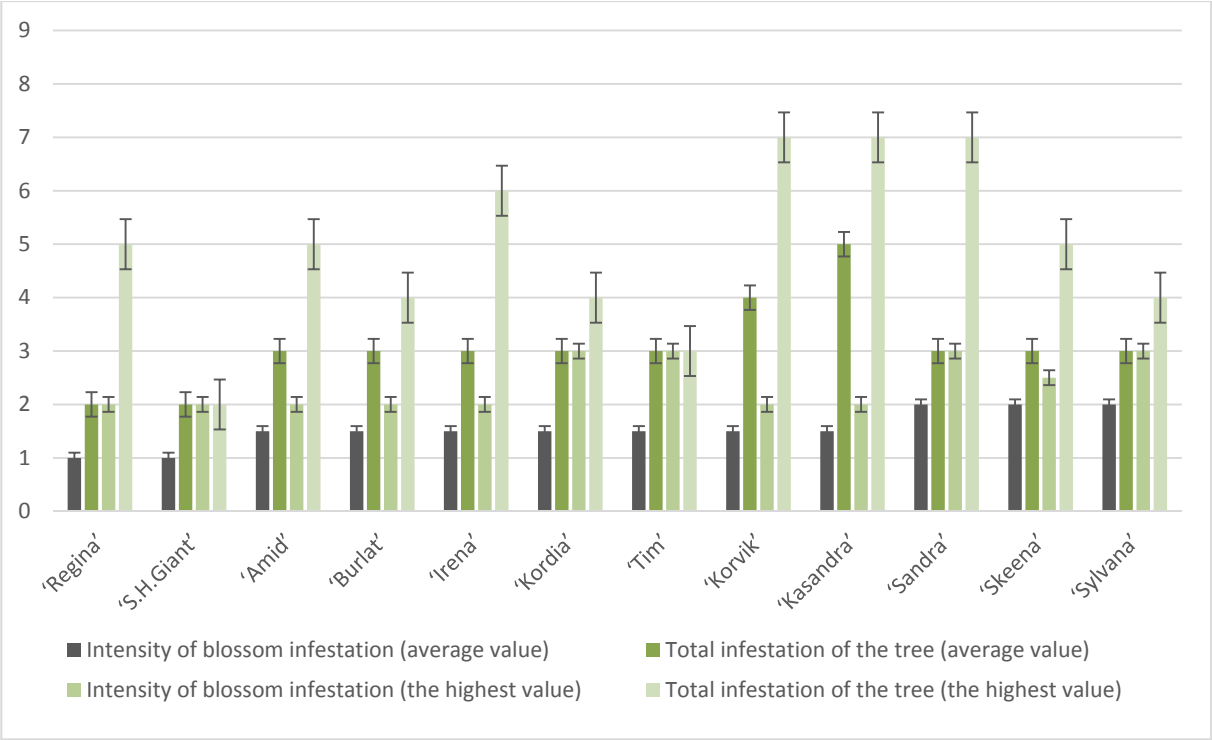

Figure 1a: Comparison of the incidence of infestation by *M. laxa* on sweet cherry cultivars.

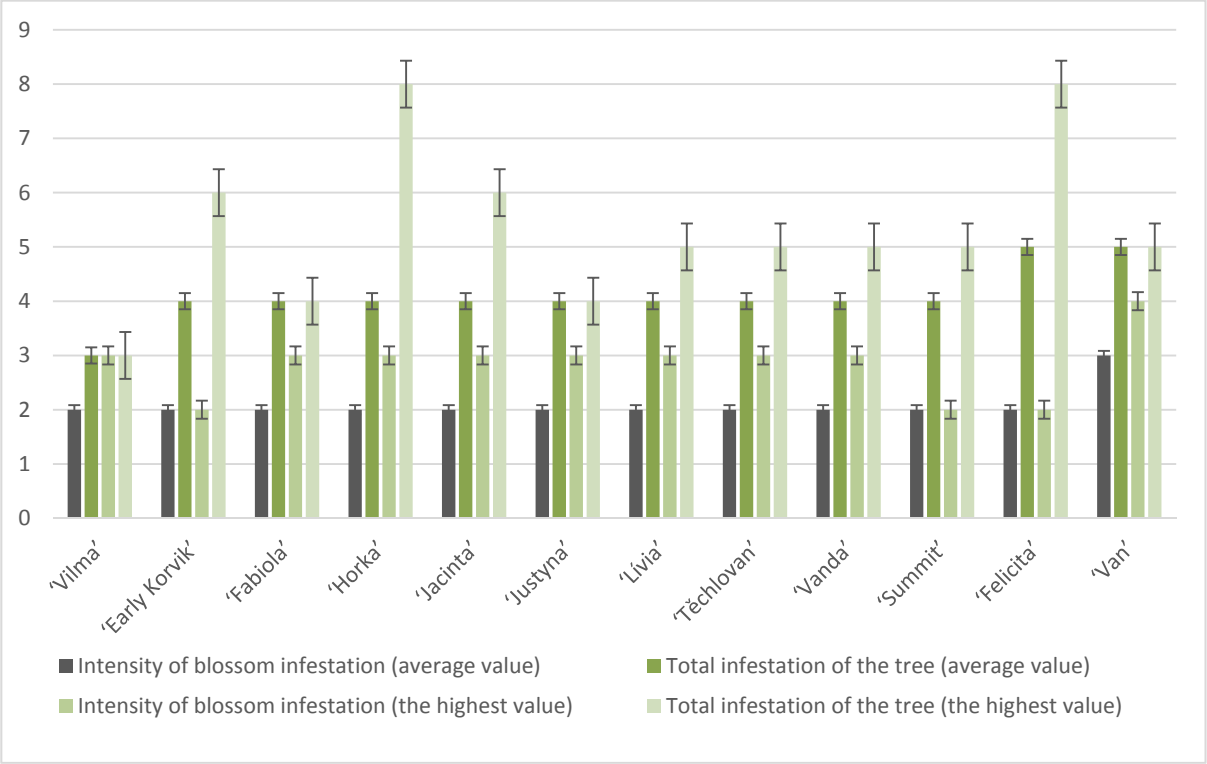

Figure 1b: Comparison of the incidence of infestation by *M. laxa* on sweet cherry cultivars.

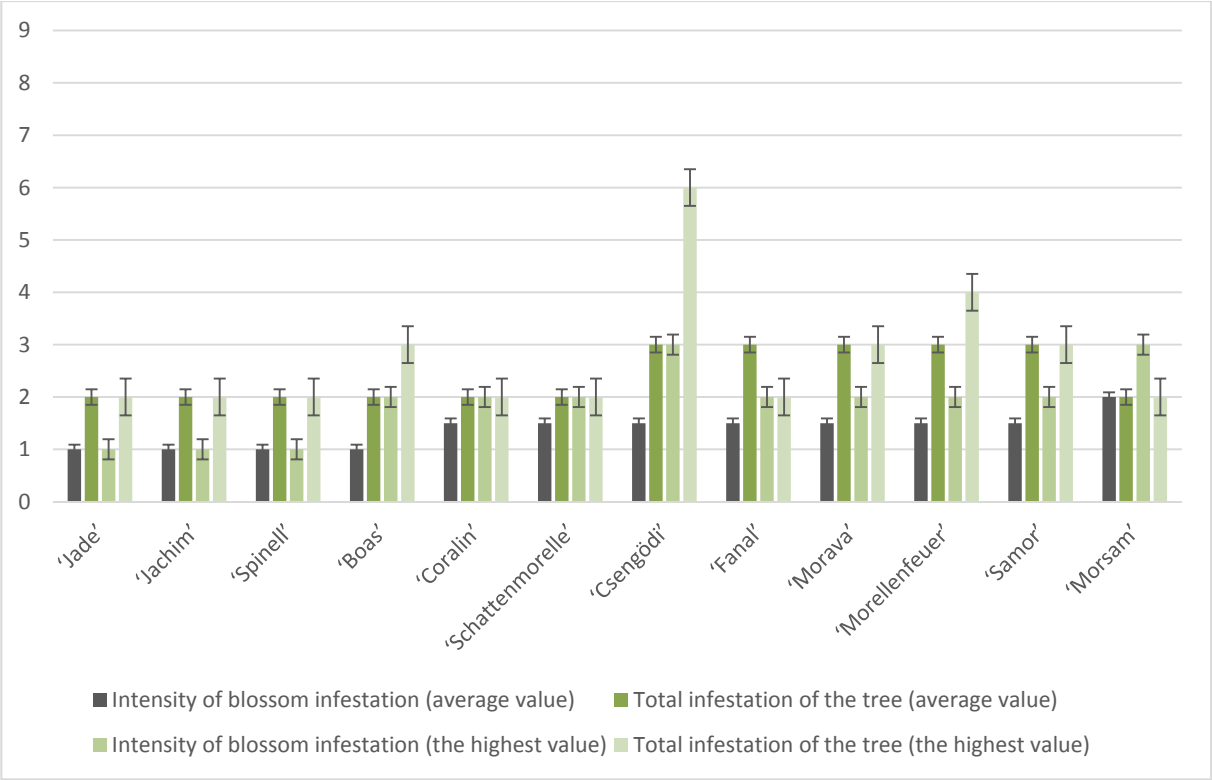

Figure 2a: Comparison of the incidence of infestation by *M. laxa* on sour cherry cultivars.

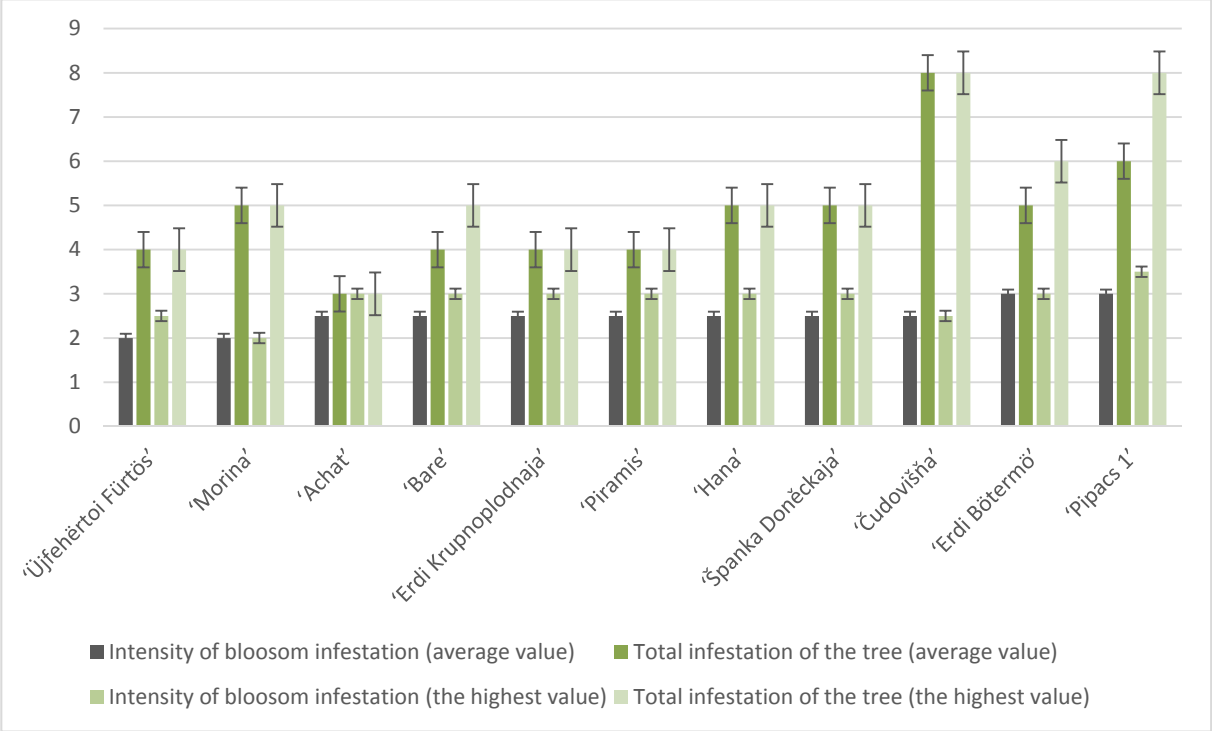

Figure 2b: Comparison of the incidence of infestation by *M. laxa* on sour cherry cultivars.

Discussion

In Europe *Monilinia* blossom blight is endemic in all areas of stone fruit production with a humid and moderately warm climate as mentioned Everhart et al. (2011) and Holb and Kunz (2013). According to Juroch (2006) in the Czech Republic the harmful effects of *M. laxa* occur only in some years when weather conditions are appropriate. The increased incidence of blossom blight was observed in this study presumably due to propitious weather conditions with relatively high temperature and unusually high relative air humidity that are sufficient to infect flowers by *Monilinia laxa.*

Acnowledgement

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